Inventory Management

INVENTORY

by Selected Retail Farm Supply Co-ops

Area IV *Kansas, Nebraska, Missouri, Iowa, and Illinois*

by T. R. Eichers

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The Farmer Cooperative Service conducts research studies and service activities of assistance to farmers in connection with cooperatives engaged in marketing farm products, purchasing farm supplies, and supplying business services. The work of the Service relates to problems of management, organization, policies, financing, merchandising, product quality, costs, efficiency, and membership.

The Service publishes the results of such studies; confers and advises with officials of farmer cooperatives; and works with educational agencies, cooperatives, and others in the dissemination of information relating to cooperative principles and practices.

Contents

Summary and Suggestions

Managers of 23 local farm supply cooperatives in Kansas, Nebraska, Missouri, Iowa, and Illinois provided information for this report. These associations were selected because they were above average for their respective States in their ability to control credit and inventory. This area was divided into two sections, a cash crop section consisting of Kansas and Nebraska and a diversified farming section consisting of Missouri, Iowa, and Illinois. The study brought out these facts on sales and inventories:

- Sales of farm supplies for 1957 in the cash crop section averaged $378,200 per association while in the diversified section they averaged over $1 million per cooperative.

- Petroleum was the major commodity in each section; however, in the diversified section, it amounted to only 37 percent of all sales compared to 65 percent in the cash crop section. Feed amounted to only 10 percent of sales in the cash crop area compared with 34 percent in the diversified area.

- Inventories of farm supplies averaged about $53,000 per association in the cash crop section and $88,000 in the diversified section. Although sales in the diversified section were nearly three times as great as in the cash crop section, inventories were only about one and a half times larger.

- The inventory turnover is helpful in evaluating inventory management. With the exception of petroleum, inventories of nearly all other supplies turned more rapidly in the diversified section than in the cash crop section. The median turnover of total supplies was 8.6 times in the diversified section in 1957-58 compared with 7.4 times in the cash crop section.

- Reordering of supplies was based primarily on visual inspection of the stock on hand. In half the associations, managers assumed complete responsibility for this visual inspection; but in the rest of the associations other employees helped them.

- Some purchasing practices used to keep inventory costs low were (1) buying in carload lots, (2) pooling with other cooperatives, and (3) preseason buying. These practices, however, may cause large inventories. To keep inventories low when using such practices, most associations gave quantity discounts and employed preseason sales campaigns.

- Taking frequent physical inventories is essential in controlling stocks of merchandise. Six associations took complete inventories monthly, 1 took them quarterly, 1 took them twice a year, and 15 took complete inventories only at the fiscal year-end.

●Special sales, discounts, auctions, and bonuses were used to help move slow-selling items. To keep inventories low, most associations gave discounts on seasonal items sold ahead of the regular season.

●One of the biggest problems of these co-ops is keeping inventories from becoming too large. Factors which affect the size of the inventory are (1) procurement practices, (2) variation in demand, (3) types of commodities sold, (4) storage space available, (5) capital available, (6) distance from supply, (7) transportation facilities, and (8) management's supervision of inventories.

●It is costly to maintain these farm supply inventories. Not only the purchase price of inventory items but the cost of storing them must be considered. Interest, insurance, shrinkage, and obsolescence usually amount to more than 10 percent of the inventory value. Thus an inventory averaging $50,000 would cost $5,000 per year.

The following suggestions, based on this and other similar studies, should be helpful to management in controlling inventories:

1. Buy in An Orderly Manner.

   a. Stock those commodities currently in demand. This requires that management be aware of new products and recognize when others should be discontinued.

   b. Buy on a systematic basis.

   c. Do not reorder until inventories become relatively low. This will help avoid excessive inventories which result in high interest costs and losses through theft, deterioration, and obsolescense.

2. Maintain Accurate Records.

   a. All stock should be carefully recorded when it is received.

   b. Frequent physical inventories are necessary to determine stock shortage and damage, how fast the stock is moving, and when to reorder.

3. Define Employee Responsibility.

   a. Delegate specific aspects of inventory management to certain personnel in the organization. The manager cannot adequately do this alone.

   b. Give employees a detailed job description of their duties in controlling inventories.

4. Use Facilities Efficiently.

   a. Don't permit display or storage areas to become cluttered. Such areas are difficult to work in and do not help sell merchandise.

   b. Handle stock as little as possible. Use pallets and mechanical lifts if inventories are large.

   c. Use space interchangeably for other items at different seasons to minimize the space required.

5. Watch Inventory Turnover.

   a. Know if stock is moving as fast as it should. Determine turnover of specific commodities and compare it with turnover of other suppliers selling this merchandise.

b. If turnover is slow, find out why. Is the stock desirable? Is the inventory too large? Are you doing a poor selling job?

6. Recognize Inventory Costs.

a. Inventories are costly. Interest, losses, and obsolescence amount to more than 10 percent of the average inventory value.

b. Minimize inventory costs by keeping inventory size at a minimum for providing dependable service to patrons.

Inventory Management by Selected Retail Farm Supply Co-ops

Area IV (Kansas, Nebraska, Missouri, Iowa, and Illinois)

by Theodore R. Eichers

Farm Supplies Branch

Purchasing Division

Careful control of inventories is an important aspect of managing any retail business. With farm supply cooperatives this phase of business management becomes increasingly important each year as more new and diversified agricultural supplies are used by farmers.

Inventory management consists primarily of three phases: (1) Obtaining merchandise, (2) handling and storing stocks of supplies, and (3) distributing inventories. When these operations are performed to obtain stocks at the lowest possible cost, to maintain them at the smallest adequate size, to store them with a minimum of handling and storage losses, and to dispose of them as rapidly and economically as possible, then inventories are being efficiently handled.

Purpose and Method of Study

This study was undertaken to determine inventory management policies and practices of farm supply cooperatives and their effect on operating efficiency. It is the fourth in a series of area studies on this subject conducted by Farmer Cooperative Service.

Specifically the objectives of this study were to:

1. Determine purchasing policies and practices affecting inventory acquisition.
2. Determine successful handling and storage practices.
3. Determine sales policies and practices affecting inventories.

Note: The author expresses appreciation to officials of the farmer cooperatives who provided information on their inventory management practices and to J. Warren Mather, Chief, Farm Supplies Branch, Farmer Cooperative Service, for assistance in planning and developing this study.

4. Recommend useful policies and practices for efficient inventory management.

Representatives of Farmer Cooperative Service interviewed 23 local farm supply cooperatives to determine their inventory policies and practices and to obtain operating data pertaining to inventory management.

The area covered in this study included Kansas, Nebraska, Missouri, Iowa, and Illinois. For purposes of analysis this area was divided into a cash crop section and a diversified farming section. The cash crop section included Kansas and Nebraska and the diversified farming section included Missouri, Iowa, and Illinois.

We selected these associations because of their superior credit control. Therefore we believed them to be better than average in their inventory management.

Volume and Type of Supplies Distributed

Sales of farm supplies in these cooperatives in 1957 ranged from $108,553 to $2,393,142 and averaged $713,290 per association (table 1). Petroleum accounted for 52 percent of all supply sales, feed accounted for 21 percent, and fertilizer and miscellaneous items each accounted for 9 percent of the total.

Not all associations handled each commodity. In those which sold a specified commodity, this commodity accounted for a larger proportion of total sales than the averages previously stated. For example, feed amounted to 33 percent of sales in those associations which sold feed compared with only 21 percent for all the cooperatives in the study, including those selling and those not selling feed.

Average sales in the diversified section were much larger, amounting to $1,078,830 per association compared to $378,210 in the cash crop section. Also the types of supplies sold were slightly different in the two areas. In the cash crop area, petroleum amounted to 65 percent of all sales, while in the diversified area it accounted for only 37 percent of the sales. Feed amounted to only 10 percent of sales in the cash crop area compared with 34 percent in the diversified section.

Acquiring Inventories

The first step in controlling inventories is acquiring them. A few of the questions which must be answered by management are: Which commodities to stock? How much and how frequently to order? How are goods to be delivered? Who is to purchase the stock?

Table 1.--Supply volume and proportion of supplies in selected commodities in 23 local farmer cooperatives, 1957-58

Section and association number	Volume	Proportion of sales in selected commodities							
		Petroleum	TBA[1]	Feed	Seed	Fertilizer	Building supplies and farm machinery	Paint and chemicals	Miscellaneous
Cash crop					*Percent*				
1	$810,908	42	12	16	3	14	(2)	-	13
2	216,456	86	3	-	-	-	-	-	11
3	628,254	44	8	31	5	12	-	-	-
4	324,548	44	6	22	-	1	18	1	8
5	325,013	74	7	-	-	10	-	1	8
6	149,365	57	11	14	-	-	1	-	17
7	223,516	88	7	-	-	-	-	2	3
8	168,221	94	2	-	-	-	-	(3)	4
9	613,596	66	5	-	-	-	-	1	28
10	108,553	69	6	8	-	10	-	1	6
11	517,497	41	3	30	-	-	6	-	20
12	452,581	75	7	-	-	1	-	1	16
Average[4]	378,210	65	6	20	4	8	8	1	12
Average of 12 associations		65	6	10	1	4	2	1	11
Median	324,750	68	7	19	4	10	6	1	11
Diversified									
13	2,393,142	41	-	51	-	8	-	-	-
14	793,480	64	-	13	-	23	-	-	-
15	890,270	58	-	29	-	13	-	-	-
16	806,861	51	2	11	2	26	5	2	1
17	1,412,828	76	(3)	-	4	15	-	4	1
18	1,353,725	32	-	13	10	9	13	-	23
19	630,814	76	(3)	-	3	14	-	6	1
20	1,508,378	6	-	74	4	8	-	-	8
21	137,189	1	-	68	9	7	4	-	11
22	873,056	1	-	58	9	19	3	2	8
23	1,067,403	-	-	56	9	15	7	1	12
Average[4]	1,078,830	41	2	41	6	14	6	3	8
Average of 11 associations		37	(3)	34	5	14	3	1	6
Median	890,270	46	2	51	7	14	5	3	8
Combined									
Average[4]	713,290	54	6	33	6	12	7	2	10
Average of 23 associations		52	3	21	3	9	2	1	9
Median	628,254	58	6	29	5	12	6	1	8

[1] Tires, batteries and accessories.
[2] Dashes indicate item not handled or not classified separately.
[3] Less than 0.5 percent.
[4] Average of those handling each item.

Ordering Merchandise

In about half the associations, managers were responsible for purchasing or ordering supplies. Department heads did the purchasing in seven cooperatives, and with the manager's approval ordered merchandise in four other associations. In the larger cooperatives purchasing was done mostly by department heads, while in the smaller ones managers did all the purchasing.

New major lines of merchandise such as anhydrous ammonia were usually stocked on the advice of: (1) Board of directors; (2) managers; (3) department heads; and (4) patrons. Other factors mentioned as important in deciding on new lines were: (1) Advice from the wholesale; (2) patron surveys; and (3) college recommendations.

In deciding on when to reorder supplies, 17 associations relied primarily on a visual inspection of the stock on hand. Visual inspection, however, is not an adequate device for maintaining inventories. If they are to be kept at the proper level, a more accurate system must be used in reordering. Management must know exactly how much stock is on hand and approximately how much of this commodity will be sold during the following week or month.

Several cooperatives used other techniques in replenishing their stocks. Some of these were: (1) Monthly inventories of certain commodities, (2) check lists, and (3) flag systems.

Purchasing Methods

In obtaining inventories the buyer must decide whether to buy in large lots to get quantity discounts and small unit transportation and handling costs, or to buy in smaller lots to keep stocks low and to minimize inventory costs, storage losses, and obsolescence.

Most of the cooperatives in this study purchased some supplies in carload lots. Commodities purchased in this manner were: (1) Feed by 10 cooperatives, (2) fertilizer by 15, (3) petroleum by 12, and (4) building supplies by 3.

Several cooperatives, to obtain quantity discounts on items used in smaller amounts, frequently purchased carloads of these items jointly with other associations.

Certain inventory procurement practices help to keep stocks low, thus minimizing interest costs on inventories, and reducing stock losses and obsolescence. Purchasing methods used by associations in this study to keep inventories low were: (1) Buying on consignment--four associations bought seed and five bought fertilizer in this manner; (2) buying on customer orders those items for which there is no great demand--two associations bought appliances, two bought seed, one bought odd-size tires, and one bought steel products in this manner.

Buying the same type of merchandise from two or more suppliers often results in relatively large inventories. The associations in this study purchased nearly all of their supplies from their wholesale cooperatives. Usually the only items purchased from any other sources were miscellaneous items that could not be obtained from the wholesale cooperatives.

Maintaining Stocks

An accurate inventory record is essential if the cooperative is to maintain stocks at the proper level. Excesses of certain items, shortages of others, and losses of some items are bound to occur if the merchandise is not properly recorded.

Inventorying

A physical count is required in controlling inventories. It is needed to determine: (1) Stock shortages; (2) items that move fast or slowly, and (3) condition of the inventory stock.

Several suggestions may be helpful in taking the inventory.[1]

1. Make a map of all places where supplies are stored. This should include all counters, shelves, bins, and out of the way places. Number the various sections of this inventory map.

2. Organize the stock for easy, accurate counting. Put all of a certain item like weed sprays in one place. This speeds counting and shows if any group of merchandise is missing.

3. Select, assign, and instruct employees for their inventory duties. Have employees check inventories in some other department than the one in which they normally work.

4. Stop all sales and repair activities during the inventory.

5. Use a standard inventory valuation method. The most common methods are cost, cost or market whichever is lower, and retail price.

6. Provide a control of listing sheets. Thus if a listing sheet is missing when the summary is made, it is an easy matter to locate where the sheet was assigned rather than recount the whole inventory.

7. Review the results of the inventory. Good items to check are those which are completely "out" or those stocked in excess.

All the associations in this study took a complete inventory at least once a year. Most of them inventoried certain items more than once a year. The frequency with which inventories were taken was as follows:

1. Daily inventories of petroleum were taken by five associations.

2. Monthly inventories of all stock were taken by six associations. Nine associations inventoried petroleum fuels monthly, two took monthly inventories of feed and fertilizer, and two inventoried tires, batteries, and accessories each month.

3. Quarterly inventories of all

[1] Western Farm Equipment, Dec. 1957. "Avoid End-of-the-Year Inventory Headaches."

supplies were taken by one association.

4. A semiannual inventory of all stock was taken by one association.

5. Annual inventories of all supplies were taken by 15 associations.

Employees generally took daily inventories. The manager, department heads, and employees took monthly, quarterly, semiannual, and annual inventories.

Daily and monthly inventories were helpful in controlling shrinkage, spotting slow-moving items, and maintaining a good turnover. Semiannual and annual inventories on the other hand served mostly to evaluate the inventory for balance sheet purposes.

Several pricing systems can be used in evaluating the inventory. Ten associations valued inventories at cost. Eleven valued their inventories at the purchase price, or the market price if that was lower. Two valued their inventories at the current wholesale price.

The boards of directors in 20 associations assisted in various ways in taking annual inventories. The board's part in the annual inventory was mostly a spot check of the employees' work; however, in a few cooperatives it actually helped take the inventories.

Shrinkage

Shrinkage or storage losses occur through improper recording, improper handling and storing, use of faulty storage areas, theft, carelessness, evaporation of fuels, and in other ways.

To keep shrinkage at a minimum, the associations found it necessary to:

1. Record all stock carefully;

2. Keep the storage area in good condition;

3. Arrange stock to make shortages noticeable;

4. Keep inventories at a minimum to prevent osbolescence, deterioration, or spoilage; and

5. Take physical inventories frequently to detect losses.

Moving Inventories

An important aspect of inventory management is moving or distributing the stock of merchandise. Inventories which remain on the shelf or must be sold at a loss are certainly not desirable. If they do not move, they should be discontinued or at least kept at a bare minimum.

The cooperatives in this study used various methods to help move inventories. Nearly all of them put on special sales of various commodities at different times throughout the year. Paint, tires, batteries, and accessories were the items most often put on sale; however, other

items such as feed, fertilizer, hardware, and appliances were also put on sale occasionally. These sales were usually reported to be quite successful. Prices on certain obsolete items sometimes had to be reduced below cost, but this practice was believed to be preferable to keeping them in stock. In fact, certain unsalable items should be discarded if they cannot be sold.

One cooperative held an auction each year to which neighboring cooperatives brought slow-moving items. These auctions were cited as very helpful in disposing of a lot of "dead" merchandise.

Several associations cited quantity discounts as an aid in moving inventories. Petroleum, feed, and fertilizer were the major items on which quantity discounts were given. Furthermore, since quantity purchases require less expense per unit of sales, volume discounts can be justified as a means of equating handling costs to all patrons.

Employee bonuses were used to a limited extent to aid in moving inventories. Some managers frowned on this practice, however, because salesmen were likely to concentrate on items on which bonuses were paid. Also, friction between salesmen sometimes occurred if one received a bonus on his items and another did not. Thus, some managers reasoned that, to prevent friction, bonuses should be given on all commodities, which was really little better than not having them on any commodity as far as increased sales were concerned.

Selling merchandise directly from the railroad car rather than putting it in storage was a good means of keeping inventories down. One association indicated it sold about half of its merchandise in this manner. Fertilizer was the item most often handled in this way. Because of the seasonal nature of fertilizer, many cooperatives did not have storage space for it, and selling from the cardoor was the only way in which it could be carried. Several associations also sold feed, seed, and other farm supplies directly from the railroad cars.

Preseason sales of seasonal items was another device used by most of the cooperatives to help move inventories. Much of the oil, grease, and fertilizer, and some of the wire, antifreeze, seed, twine, and tires were moved by such sales.

Inventory Size

How big should inventories be? Should they be large enough to meet all patrons' requests at all times? Or should they be limited to meet most of the patrons' requests, realizing that occasionally a few items may be out of stock?

One of the major problems with inventories is keeping them from becoming too large. A shortage of stock is readily noticed and quickly remedied, but the manager's attention is seldom drawn to an oversupply of goods.

Some managers are inclined to stock up if the space is available.

However, the practice of maintaining excessive inventories can result in serious losses in several ways: (1) Capital is tied up; (2) actual storage losses may occur through deterioration, theft, fire, and the like; (3) speculative losses can occur through price declines, and (4) inventories may become obsolete while standing on the shelf.

Factors Affecting Size

Some practices and conditions affecting inventory size have been discussed previously, but these and others are brought together in this section of the report.

Procurement Practices

If the cooperative obtains production supplies in carload lots, inventories must be larger than when stock is purchased in smaller lots. Pooling with other cooperatives, on the other hand, could enable cooperatives to obtain quantity discounts without purchasing a full carload. Most of the cooperatives studied did obtain some items in carload lots, especially feed and fertilizer. Several cooperatives pooled purchases with other cooperatives, especially steel goods and chemicals.

Seasonal Variation in Demand

Most farm commodities have a seasonal demand. Seed, fertilizer, tractor fuels, heating fuel, and even feed requirements vary throughout the year. Often these seasonal items are purchased in advance to assure delivery before they are needed. Usually this practice results in a discount from the wholesale cooperative; however, if the local should want to purchase all its supplies in advance this would require large amounts of storage space. Some locals included in the study met this situation by granting discounts to their patrons for preseason purchases.

Types of Commodities Sold

The demand for hardware, farm machinery, and building supplies is not as great or as predictable as for feed or petroleum. Therefore, inventories of such merchandise must be much larger in relation to sales than those of feed or petroleum. Supplies of farm machinery usually must be sufficient for 6 to 9 or more months while those of feed and petroleum may be less than 1 month.

Amount of Storage Space Available

A limited amount of storage space will necessitate smaller inventories than might be carried if space were adequate or excessive. Although several managers wanted additional storage, a limited storage space has its advantage in limiting inventories. If increased storage space will not result in an increase in sales or permit more efficient purchasing or handling of stock, there is no sound reason to add it.

Amount of Capital Available

Limited capital may also curtail inventories. Again, unless larger stocks of merchandise result in more sales or more efficient purchasing and handling there is no advantage in increasing inventories. Only a few of the cooperatives in this study indicated they would like to stock larger inventories if they had the capital to do so.

Distance from Supply

A cooperative located at a great distance from its wholesale will be required to carry a larger stock of supplies than those located close to the source of supply. Several associations included in this study were located so close to the source of supply that they needed very small inventories; in fact a few could make deliveries directly from the wholesale's warehouse or plant.

Transportation Service

Transportation service can affect inventory size if such service is especially good or poor, but all associations in this study indicated that transportation facilities and services were good and did not in any way affect their inventory size. One preferred to pay the demurrage on railroad cars and sell feed directly from the car rather than unload feed into its warehouse. This not only helped reduce its inventory but also greatly reduced handling and storage costs.

Manager's Supervision of Inventory

A close check on stocks of supplies by management is probably the most effective inventory control. If management keeps accurate monthly inventory records and check lists, it should be able to maintain adequate inventories and yet keep them relatively small.

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In summarizing, inventories should be "just large enough." This poses a problem in deciding what is large enough. Shall the cooperative attempt to provide the best possible service? This would require considerably larger inventories than if the cooperative provides a highly acceptable service, knowing that occasionally it may be unable to meet certain patron's requests. The minimum stock supply of course will vary with each commodity. It may be as little as a 3-day supply with petroleum or it may be as great as a 1-year supply for farm machinery. To keep inventories at an absolute minimum may require purchasing in small lots, thus losing quantity discounts and paying more per unit for transportation, bookkeeping, and handling costs. The manager must determine at what point inventory costs equal the savings resulting from a relatively large inventory. The inventory at this point is, perhaps, the amount that should be maintained.

Commodity Variations

Inventories used in this study were averages of the beginning and ending inventory in the 1957-58 fiscal year of the associations studied. Two associations kept monthly inventories and the average of these was slightly higher than that of their year-end inventories. In one of these associations, year-end inventories were 96 percent of the monthly average, while in the other they were 80 percent of the monthly average.

Supply inventories of the cooperatives in this study ranged in value from $8,553, to $192,336 and averaged $69,892 (table 2). Cooperatives in the cash crop section had an average of $53,301 in supply inventories while associations in the diversified section had $87,992 in such inventories. Those in the diversified section were about 50 percent larger than in the cash crop

Table 2.--Size of farm supply inventories and proportion represented by specific commodities in 23 farmer cooperatives, 1957-58

Section and association number	Inventory[1]	Proportion of inventory in specified commodities							
		Petroleum	TBA[2]	Feed	Seed	Fertilizer	Building supplies; machinery	Paint and chemicals	Miscellaneous
					Percent				
Cash crop									
1	$160,794	18	27	10	6	16	(3)	-	23
2	14,942	58	8	-	-	-	-	-	34
3	99,415	15	16	[4] 69	-	-	-	-	-
4	80,945	8	8	14	-	-	36	2	32
5	31,078	29	23	-	-	23	-	5	20
6	22,578	22	42	10	-	-	26	-	-
7	13,657	50	31	-	-	-	-	1	18
8	8,553	45	12	-	-	-	-	-	43
9	51,638	20	10	-	-	-	-	1	69
10	11,321	32	16	8	-	27	-	2	15
11	69,037	11	-	3	-	-	9	-	[5] 77
12	75,648	43	28	-	-	1	-	3	25
Average[6]	53,301	29	20	19	6	17	24	2	36
Average of 12 associations		29	18	9	1	6	6	1	30
Median		26	16	10	6	20	26	2	29
Diversified									
13	106,432	44	4	31	(4)	6	-	11	4
14	79,886	62	-	19	-	19	-	-	-
15	124,351	42	-	39	-	19	-	-	-
16	75,838	18	10	9	2	23	20	10	8
17	80,900	52	3	-	1	29	-	10	5
18	192,336	4	-	3	15	1	38	-	39
19	51,460	45	6	-	1	19	-	19	10
20	76,951	15	-	35	4	8	-	-	38
21	17,302	1	-	23	12	22	15	-	27
22	54,708	1	-	51	8	4	15	6	15
23	107,748	-	-	40	4	1	26	5	24
Average[6]	87,992	28	6	28	6	14	23	10	19
Average of 11 associations		26	2	23	4	14	10	6	15
Median		30	5	31	4	19	20	10	15
Combined									
Average[6]	69,892	29	16	24	6	15	23	6	28
Average of 23 associations		28	11	16	2	9	8	3	23
Median		26	12	19	6	19	23	5	24

[1] Average of beginning and ending inventory, 1957-58.
[2] Tires, batteries, and accessories.
[3] Dashes indicate item not handled or not classified separately.
[4] This was elevator merchandise and included miscellaneous items.
[5] Also includes machinery, hardware, and the like.
[6] Average of only those associations handling each item.

section, but supply sales of the cooperatives in the diversified section were about 3 times larger than those in the cash crop section.

Petroleum was the largest inventory item, accounting for 28 percent of inventories in the 23 associations studied. Petroleum was also the largest sales item accounting for 52 percent of the sales (figure 1). Tires, batteries, and accessories accounted for 11 percent of the inventories and only 3 percent of the sales. Feed amounted to 16 percent of the inventory and 21 percent of the sales.

Commodities varied somewhat in the two sections. Petroleum amounted to 29 percent of the inventory in the cash crop section and 26 percent in the diversified section (table 2). Feed amounted to only 9 percent of inventories in the cash crop section compared with 23 percent in the diversified section. Fertilizer amounted to 6 percent in the cash crop section and 14 percent in the diversified section.

Inventory Turnover

The inventory turnover is a valuable tool in measuring the efficiency of the use of inventory capital. An inventory turnover ratio relates inventory size to sales. It shows how many times the stock supply was sold in 1 year. Turnover is usually calculated by dividing cost of sales by cost of inventory. A monthly average inventory is more meaningful than a quarterly average or a beginning and end-of-the-year average.

A turnover of 12 times means that the inventory was sold once each month. This measure can be expressed as the number of days' supply in inventory. A turnover of 12 times means the association normally had 30 days supply of this commodity on hand based on 365 days a year, or 25 days' supply based on 300 selling days a year.

Turnover in different associations will vary because of the amount and type of supplies sold, distance from source of supplies, transportation facilities, storage space, and other factors. However, usually one can assume that cooperatives with high turnover ratios are managing inventories more efficiently than those with low turnover.

Median turnovers are used in this report rather than average turnovers because a few excessively large turnovers tended to distort the average. The median turnover of total supplies for all the cooperatives in this study was 8.3 times in 1957-58 (table 3). The range was from 3.4 times to 18.7 times (figure 2 and table 3). The associations with the highest turnover had approximately 7 times more volume than those with the lowest turnover. Commodities sold were similar in each organization.

Commodities turned 8.6 times in the diversified section of the area studied compared with 7.4 times in the cash crop section (figure 3). This was probably due to the larger sales volume in the diversified area.

Figure 1

Retail Sales And Year-End Inventories Of Selected Commodity Groups, 1957

(23 Local Farm Supply Cooperatives in 5 Midwestern States)

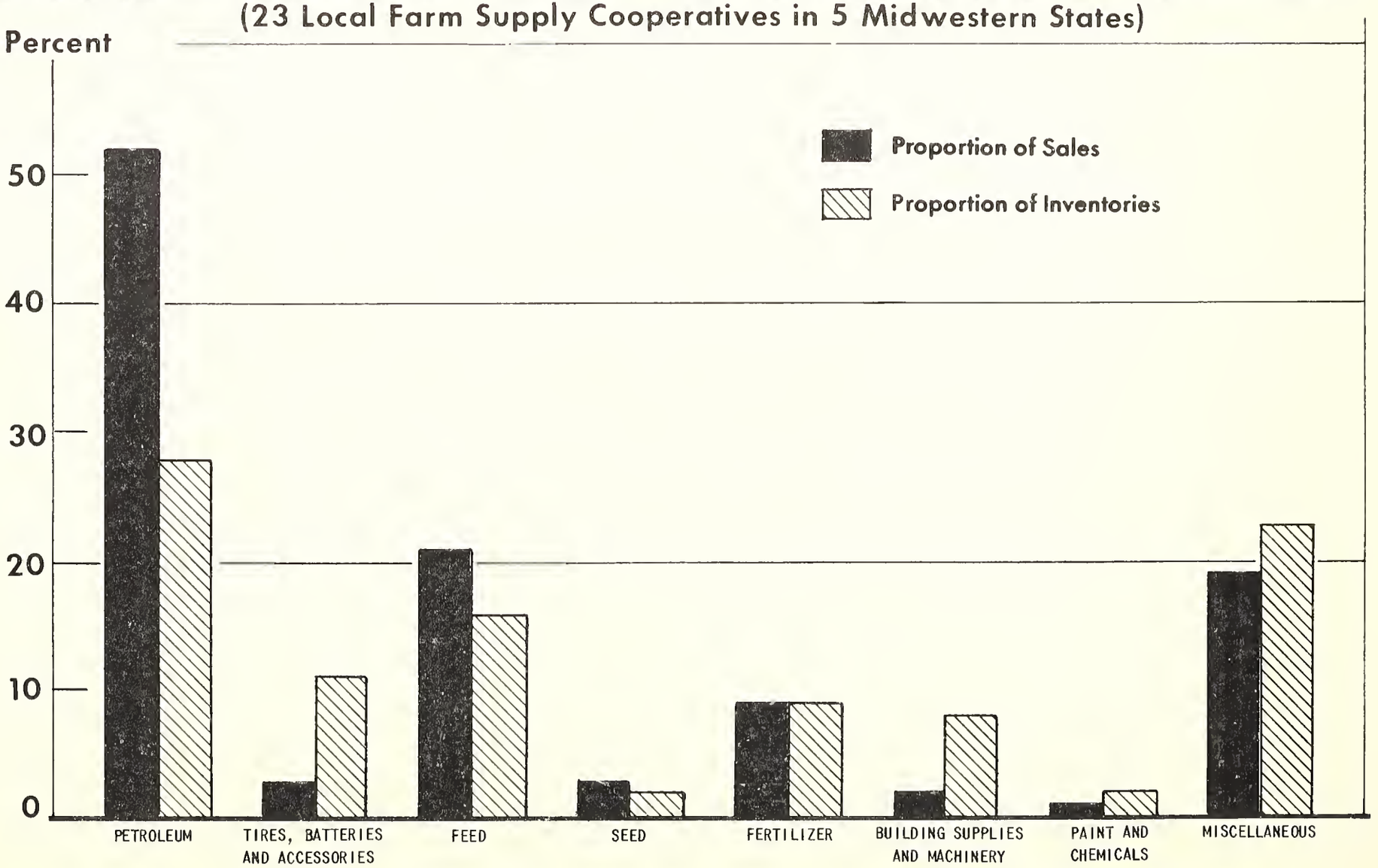

Table 3.--Inventory turnover of selected farm supplies in 23 farmer cooperatives, 1957-58[1]

Section and association number	Total	Petroleum	TBA[2]	Feed	Seed	Fertilizer	Building supplies and farm machinery	Paint and chemicals	Miscellaneous
					Times per year				
Cash crop									
1	4.2	9.4	2.0	7.1	2.3	3.7	(3)	-	2.3
2	11.2	16.2	3.8	-	-	-	-	-	4.0
3	4.7	12.5	2.6	-	-	-	-	-	-
4	3.4	19.2	1.9	5.9	-	6.8	1.9	2.0	2.1
5	8.3	21.4	2.7	-	-	2.8	-	.9	3.6
6	5.5	15.9	1.7	11.1	-	-	.3	-	-
7	13.5	23.7	3.3	-	-	-	-	25.3	2.5
8	15.4	31.2	3.9	-	-	-	-	-	1.8
9	9.8	31.4	5.0	-	-	-	-	2.5	4.4
10	8.1	16.8	2.6	9.6	-	3.5	-	5.9	3.2
11	6.6	22.3	-	72.7	-	-	2.0	-	3.4
12	5.0	8.3	1.4	-	-	3.7	-	.9	3.8
Average of those handling each item	8.0	19.0	2.8	21.3	2.3	4.1	1.4	6.3	3.1
Median	7.4	18.0	2.6	9.6	2.3	3.7	1.9	2.3	3.3
Diversified									
13	18.7	15.8	2.7	30.0	11.2	23.7	5.8	2.8	.8
14	8.0	8.0	-	5.9	-	9.7	-	-	-
15	5.9	7.8	-	4.3	-	4.0	-	-	-
16	8.6	22.3	1.5	14.0	8.5	10.3	1.2	1.4	3.0
17	14.5	20.5	1.5	22.6	106.6	8.7	-	3.9	2.7
18	5.4	39.2	-	-	4.1	55.6	2.5	-	2.7
19	10.2	16.4	.8	-	20.6	9.0	-	3.1	1.0
20	17.8	7.6	-	38.1	15.6	16.5	-	-	3.4
21	7.5	10.3	-	17.2	7.4	7.0	1.9	-	3.0
22	13.6	9.6	-	15.4	15.8	70.8	2.9	3.4	15.4
23	8.4	-	-	11.6	18.2	119.0	1.8	2.4	5.0
Average of those handling each item	10.8	15.8	1.6	17.7	23.1	30.4	2.7	2.8	4.1
Median	8.6	13.1	1.5	15.4	15.6	10.3	2.2	3.1	2.9
Combined									
Average	9.3	17.5	2.5	19.0	21.0	22.2	2.3	4.5	3.6
Median	8.3	16.3	2.6	12.8	13.4	8.9	1.9	2.7	3.0

[1] Turnover based on cost of goods sold and average of year-end inventories.
[2] Tires, batteries, and accessories.
[3] Dashes indicate item was not handled or not classified separately.

Turnover should be calculated for each commodity if the ratio is to be of value. Petroleum may turn 30 or more times a year while machinery may turn no more than once or twice each year. In this study fertilizer turned 8.9 times, seed 13.4 times, feed 12.8 times and petroleum turned 16.3 times in 1957-58 (table 3). Median rates were substantially lower than averages for these items.

Petroleum and related products turned more rapidly in the cash crop area--18 times compared with 13.1 times in the diversified area. Feed and fertilizer turned more rapidly in the diversified farming section than in the cash crop section. In this section feed turned 15.4 times compared to 9.6 times in the cash crop section. Fertilizer turned 10.3 times compared to 3.7 times in the cash crop section (table 3).

When these turnovers are stated in terms of days' supply on hand, the cash crop section had an average of 20 days' supply of petroleum compared with 27 days in the diversified section; 38 days' supply of feed compared with 21 days for the diversified section; and 97 days' supply of fertilizer compared with 35 days for the diversified section.

These cooperatives had an average of 3 to 4 weeks supply of petroleum on hand, yet many of them got weekly deliveries of petroleum. Theoretically in these associations it should be possible to keep stocks down to an average amount equal to half of their weekly deliveries. Thus with deliveries every 7 days average inventories might be as low as a 4 days' supply, provided management knew exactly how much of a certain commodity would be required before the next delivery. However, stocks larger than this absolute average minimum of half of regular deliveries must be carried because management does not know exactly how much of the item will be required and it may not know precisely the time of the next delivery. Also to keep stocks at this bare minimum might require costly small orders. Because of these factors the average supply on hand usually greatly exceeds half of the amount of regular deliveries to the associations during a specified period.

Inventory Costs

Inventory costs are closely related to inventory size and turnover. These costs include interest, insurance, taxes, shrinkage, and obsolescence. According to several authorities these may easily amount to 10 percent of the average inventories on hand each year.

At this rate inventory costs would amount to $28 for 1 day's supply of inventory or $140 for 5 days' supply if sales amounted to $100,000 per year. Or stated in another way, reducing the supply of inventory by only 5 days will result in yearly savings of $140 in an association with $100,000 sales. Such costs for other volumes and turnover rates are shown in table 4.

The 23 cooperatives used in this study had an average of 43 days' supply of merchandise on hand and their average sales amounted to $713,290 a year in 1957-58. At the

Figure 2

Inventory Turnover For All Supplies, 1957

(23 Local Farm Supply Cooperatives in 5 Midwestern States)

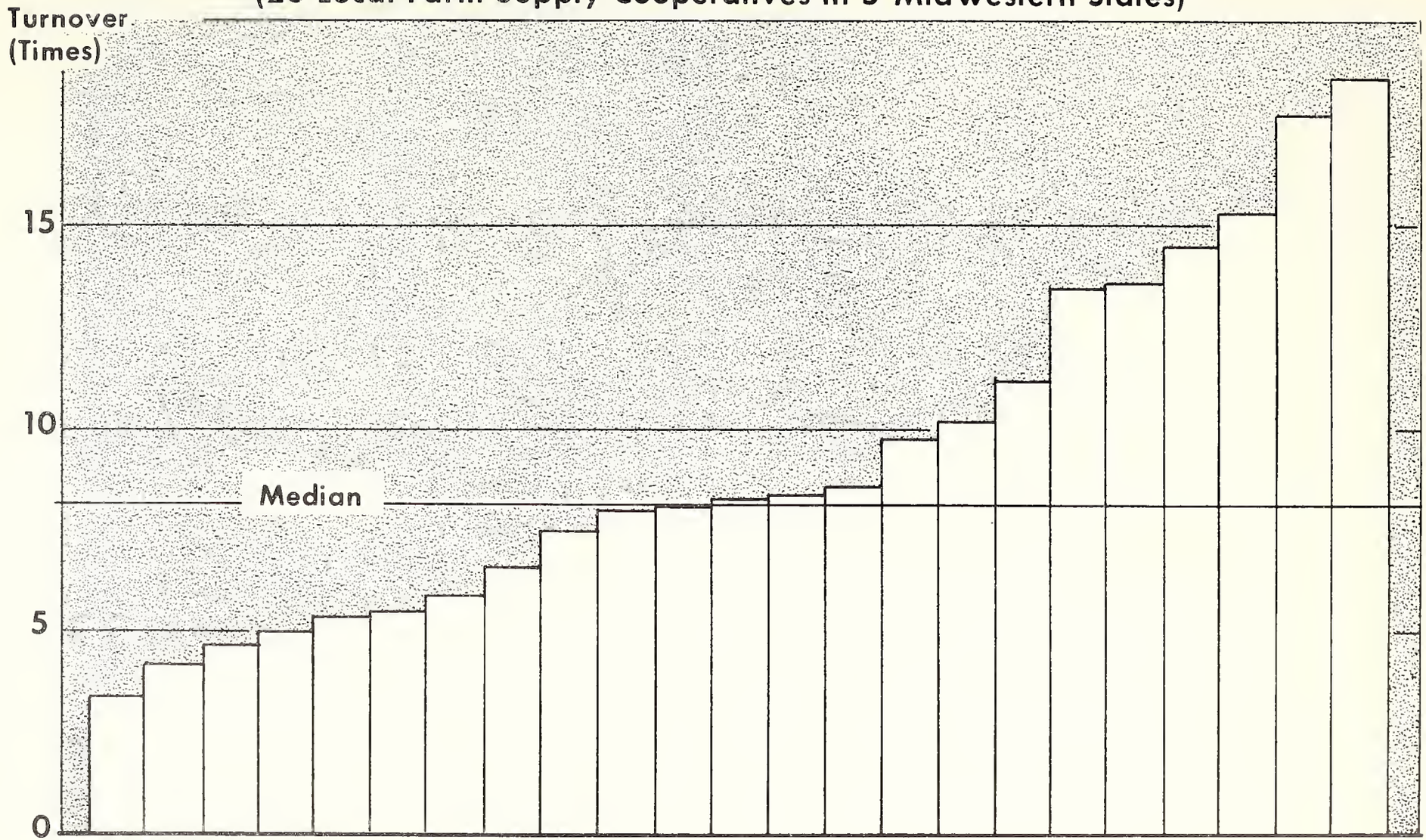

Figure 3

Inventory Turnover For Selected Commodity Groups, 1957

(23 Local Farm Supply Cooperatives in 5 Midwestern States)

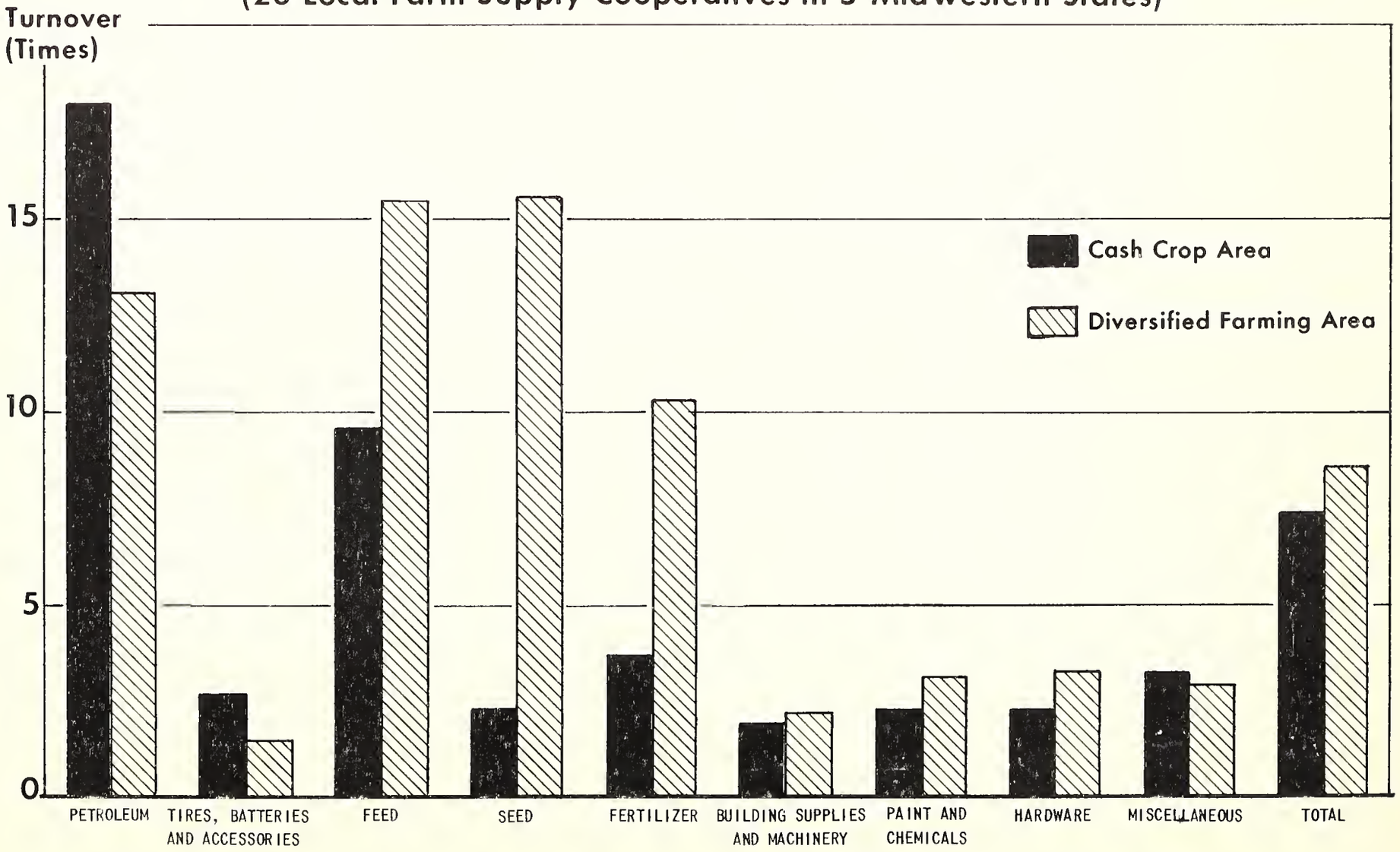

Table 4.--Estimated annual inventory costs for cooperatives with various volumes and inventory turnover rates[1]

Inventory turnover times per year	Number of days' supply in inventory	Annual inventory costs with sales of:						
		$100,000	$200,000	$300,000	$400,000	$500,000	$1,000,000	$2,000,000
360	1	$28	$56	$84	$112	$140	$280	$560
72	5	140	280	420	560	700	1,400	2,800
36	10	280	560	840	1,120	1,400	2,800	5,600
24	15	420	840	1,260	1,680	2,100	4,200	8,400
18	20	560	1,120	1,680	2,240	2,800	5,600	11,200
12	30	840	1,680	2,520	3,360	4,200	8,400	16,800
6	60	1,680	3,360	5,040	6,720	8,400	16,800	33,600
4	90	2,520	5,040	7,560	10,080	12,600	25,200	50,400
2	180	5,040	10,080	15,120	20,160	25,200	50,400	100,800
1	360	10,080	20,160	30,240	40,320	50,400	100,800	201,600

[1] Based on costs amounting to 10 percent of average inventories.

rates used in table 4, inventories cost these associations about $8,590 a year.

The 12 cooperatives with largest volumes had average sales amounting to $1,097,425 and an average of 36 days' supply of merchandise on hand. Inventory costs in these organizations amounted to about $11,060. The smaller ones had an average volume of $294,230 and an average supply of 42 days, so their inventory costs were about $3,460 each.

With a turnover of only twice a year, inventories will cost $5 per $100 of sales. If the turnover is 20 times a year, inventories will cost 50 cents per $100 of sales. In this study those cooperatives with more than 87 percent of fast-moving items had a turnover averaging 11.6 times in 1957-58, so their inventory costs were about $0.86 per $100 sales. Those associations with less than 87 percent of fast-moving items had a turnover of 6.8 times and inventories cost them about $1.47 for each $100 of sales.

Regionals' Influence on Inventory Management

Most associations indicated that their regional suppliers did not greatly influence their inventory practices.

Five associations said that the regional supplier helped control inventories by spotting slow items, suggesting new salable merchandise, and not trying to overload them. Three associations said that the regional suppliers adversely affected inventory management by trying to pressure the local into stocking

unwanted merchandise or carrying an excess of stock.

Several indicated dissatisfaction with regional incentive programs because these caused friction among employees, excesses of certain items, and loss of time for employees who were on trips. Several managers said that extra margins gained through special sales should go to the patron rather than to the salesman.

Fifteen managers indicated that the regional supplier in no way affected their management of inventories.

The regional suppliers are sometimes in a good position to aid local cooperatives in controlling inventory by: (1) Spotting slow-moving items, (2) suggesting fast-moving items and (3) resisting over stocking of any commodity. Only one association indicated, however, that the regional assisted in spotting slow-moving items. The other associations said they did not need such a service and were not aware that the regional suppliers offered it.

Area Comparisons

Farmer Cooperative Service has completed inventory studies among farmer cooperatives handling farm supplies in five areas of the country. A comparison of these areas is shown in table 5. Area I includes Indiana, Ohio, Michigan, and Pennsylvania. Area II covered Washington, Oregon, Idaho, and Utah. Area III comprises Wisconsin, Minnesota, North Dakota, South Dakota, and northern Iowa. Area V included Tennessee, Alabama, Mississippi, and Arkansas.

In all areas sales have increased during the period included in the study.[2] In all except Area IV inventories increased at the same, or at a slower rate, than sales; but in Area IV inventories increased 25 percent during the 5 years while sales increased 21 percent.

Inventories in Area IV turned at a slower rate than in all areas except III. In Areas I, II, and V, however, turnovers were calculated on the basis of sales rather than on cost of sales as in Areas III and IV. If turnovers had been calculated on the basis of sales in Area IV, the turnover of total supplies would have been 11.4 times in 1957-58, which is comparable to Area I and II but slightly less than Area V.

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[2] See footnote 2 in table 5.

Table 5.--Measures of inventory operations in farmer cooperatives retailing farm supplies in five areas of the United States

Item	Area[1]				
	I	II	III	IV	V
For 5-year period studied[2]			*Percent*		
Increase in farm supply sales	12	20	30	21	28
Increase in farm supply inventories	12	12	28	25	28
For last year of study[2]					
Percent of total assets in inventories at end of year	18	26	20	21	16
Inventory turnovers[3]			*Times per year*		
Feed	20	(4)	12	13	18
Seed	8	(4)	12	14	12
Fertilizer	23	33	4	8	26
Petroleum	23	41	15	17	(4)
Building supplies	4	(4)	(4)	4	(4)
Farm machinery	3	1	(4)	2	(4)
Tires, batteries, accessories	(4)	4	2	2	(4)
Hardware	(4)	3	(4)	3	(4)
Other supplies[5]	6	5	2	3	7
Total	11.4	9.0	6.1	8.3	15.0
Associations in each study	8	9	20	23	8

[1]States in each area are as follows:
Area I--Indiana, Ohio, Michigan, and Pennsylvania.
Area II--Washington, Oregon, Idaho, and Utah.
Area III--Wisconsin, Minnesota, North Dakota, South Dakota, and northern Iowa.
Area IV--Kansas, Nebraska, Iowa, Missouri and Illinois.
Area V--Tennessee, Alabama, Mississippi and Arkansas.

[2]Period covered in Areas I and II was for fiscal years ended in 1952-56. Period covered in Area III was for calendar years 1952-56. Areas IV and V covered fiscal years ended in 1954-58.

[3]Area I turnovers were based on annual sales and average quarterly inventories.
Area II turnovers for individual commodities were based on total sales and average monthly inventories for five associations.
Area III and IV turnovers for individual commodities were based on cost of goods sold and year-end inventories.
Area V turnovers were based on total sales and average of 5 to 12 inventories a year for 7 associations.

[4]Data were not available; included in "other supplies" if handled.

[5]Items in this group are not comparable in each area.

Other Publications Available

Inventory Management by Selected Retail Farm Supply Cooperatives, Area I, General Report 38; Area II, Service Report 37; Area V, Service Report 39, John M. Bailey - Area III, General Report 50, Ted R. Eichers.

Credit Control in Selected Farm Supply Cooperatives, Area I, General Report 35; Area II, Service Report 36; and Area V, Service Report 41, John M. Bailey - Area III, General Report 43; and Area IV, General Report 57, Ted R. Eichers.

How Cooperatives Use Credit Agencies, General Report 52, J. M. Bailey, A. H. Pursell, and R. E. Engberg.

Controlling Open Account Credit in Feed Cooperatives, FCS Circular 24, Charlie B. Robbins and Lacey F. Rickey.

Integrated and Related Operations Central Carolina Farmers Exchange, General Report 44, Martin A. Abrahamsen.

U.C.F. United Cooperative Farmers Inc., A Study in Economic Integration, General Report 45, John M. Bailey.

Integrated and Related Petroleum Operations Through Farmer Cooperatives, 1950 and 1957, General Report 58, Anne L. Gessner and J. Warren Mather.

Integrated Operations Hamilton Farm Bureau Cooperative, General Report 61, Martin A. Abrahamsen.

Mobile Feed Milling by Cooperatives in Michigan and Wisconsin, General Report 63, Arno J. Hangas.

Distribution of Fertilizer by Cooperatives in the South. FCS Bulletin 11, Warren K. Trotter.

Manufacture of Fertilizer by Cooperatives in the South, FCS Bulletin 13, Warren K. Trotter.

Copies of these publications may be obtained upon request while a supply is available from—

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